EE 620: Physics of Transistors
Assignment 2: Report
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1. Substrate doping (N A) = 1e16; Tox =5nm; N Poly =5e19.
gate is 20nm thick, oxide 5nm, substrate 400nm
For gate and oxide- q1.m for substrate- cmos.m
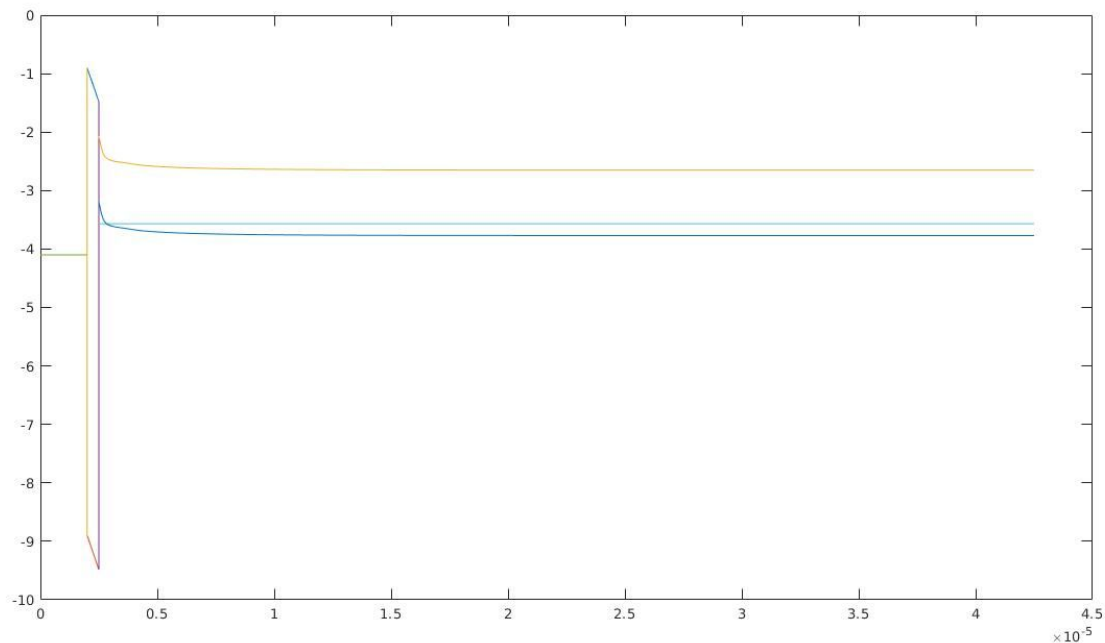In matlab-
In cmos.m, set vstart=(the Vg you want);
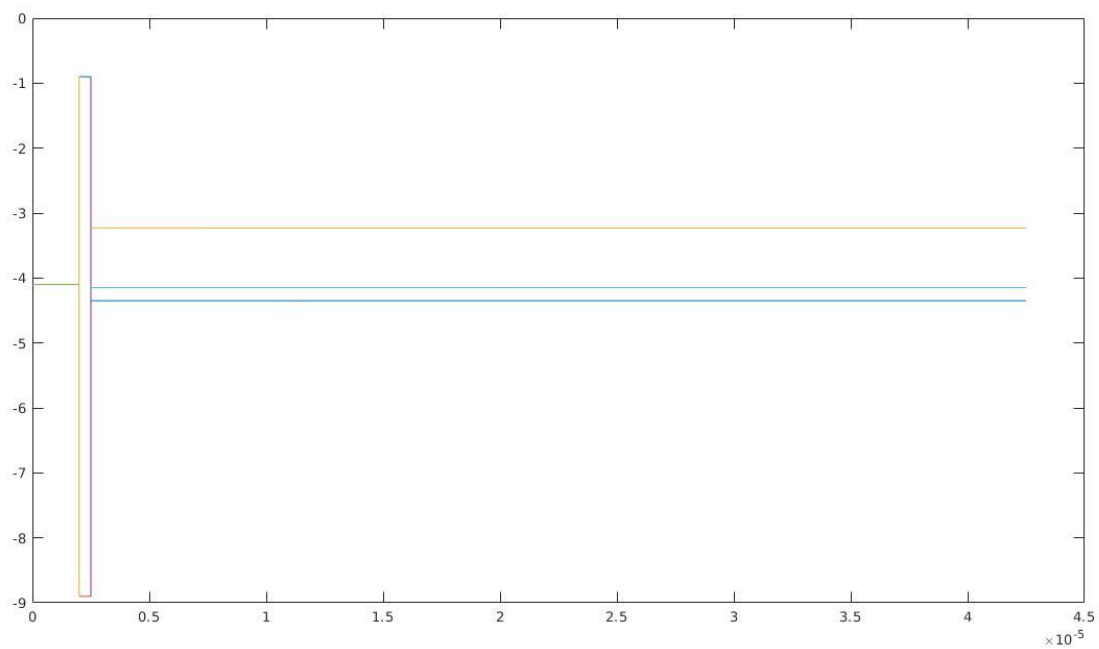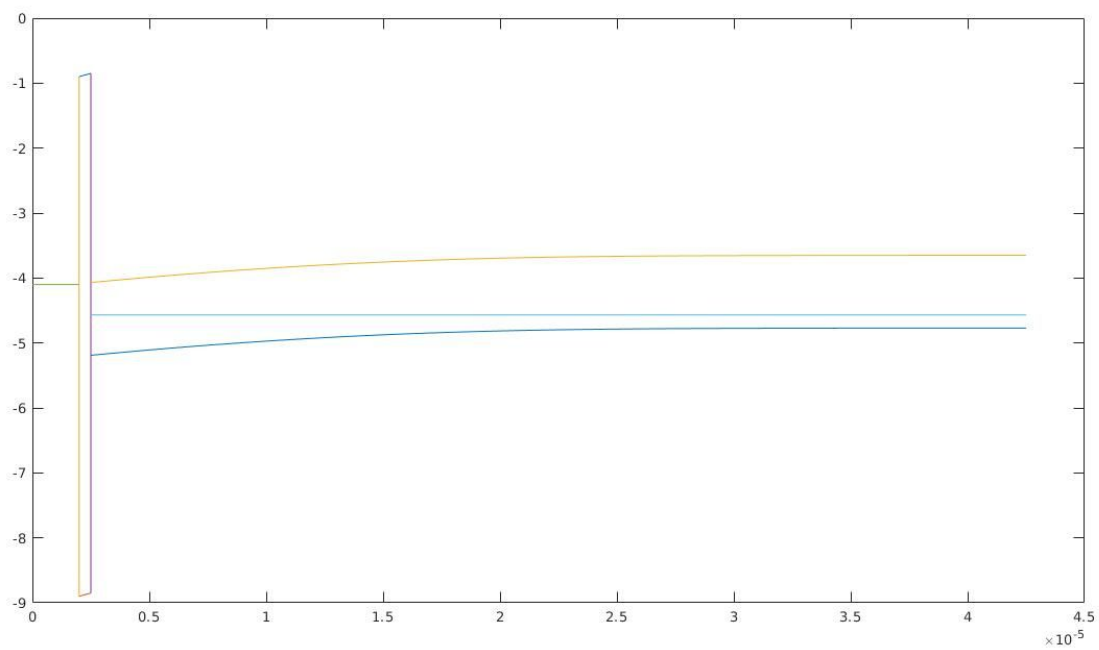In q1.m set Vg= (the Vg you want)
In command window, run in order
cmos
q1
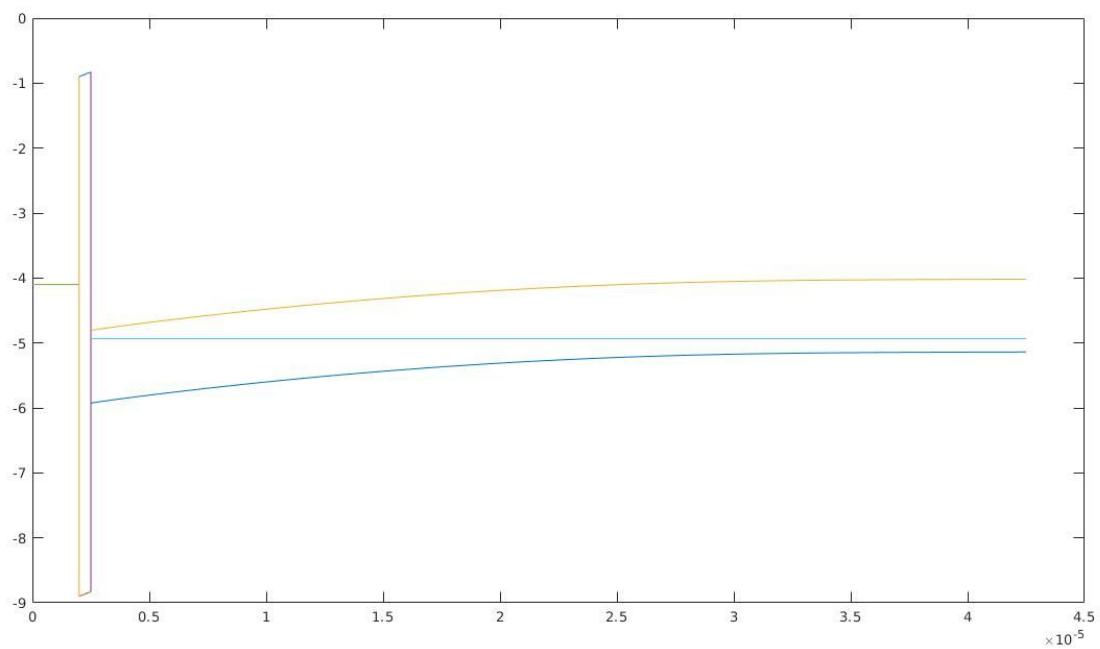(On the substrate side, orange- Conduction band, dark blue- valence band, light blue- Fermi level)

Vg=-1.5V accumulation

Vg=Vfb (~-0.92V)
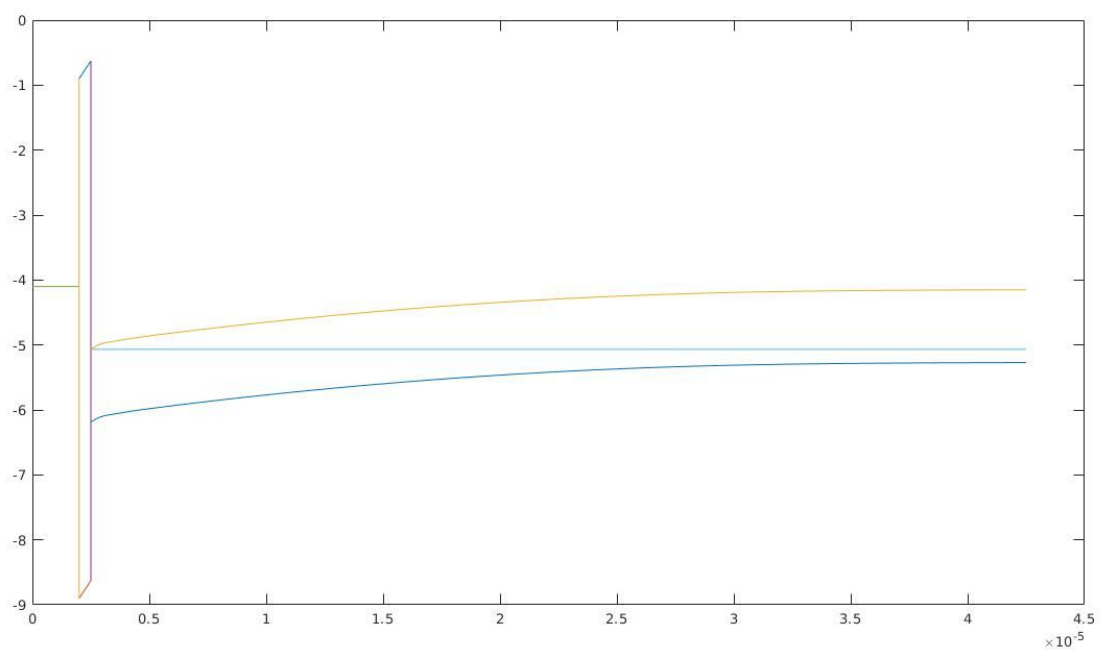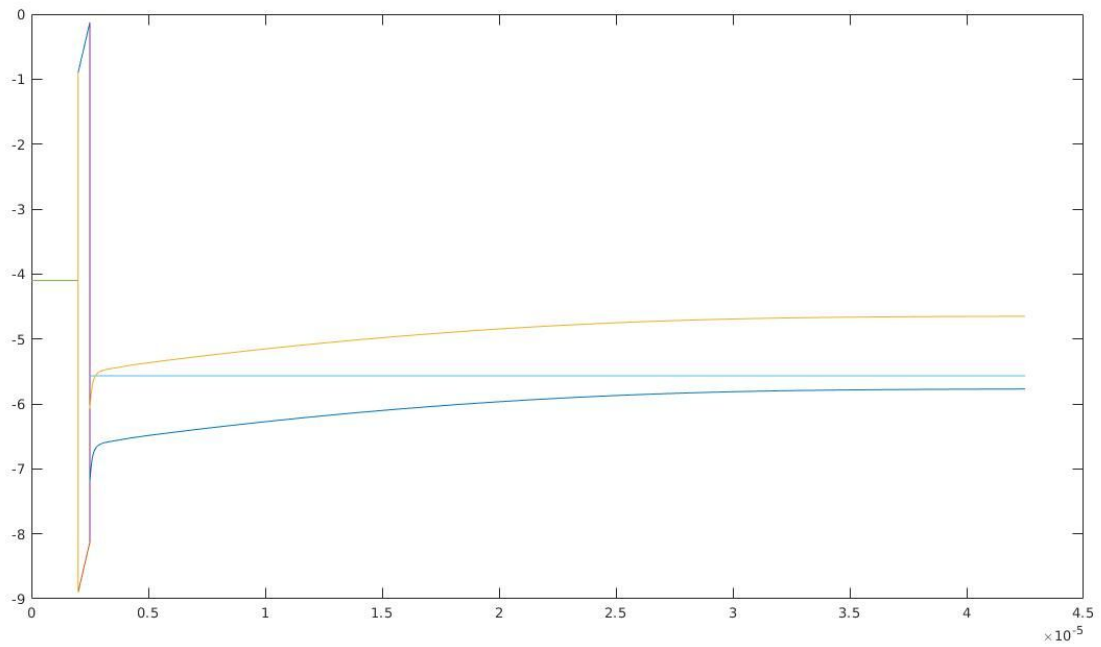

Vg=-0.5V depletion

Vg=Vt (~-0.1317V)

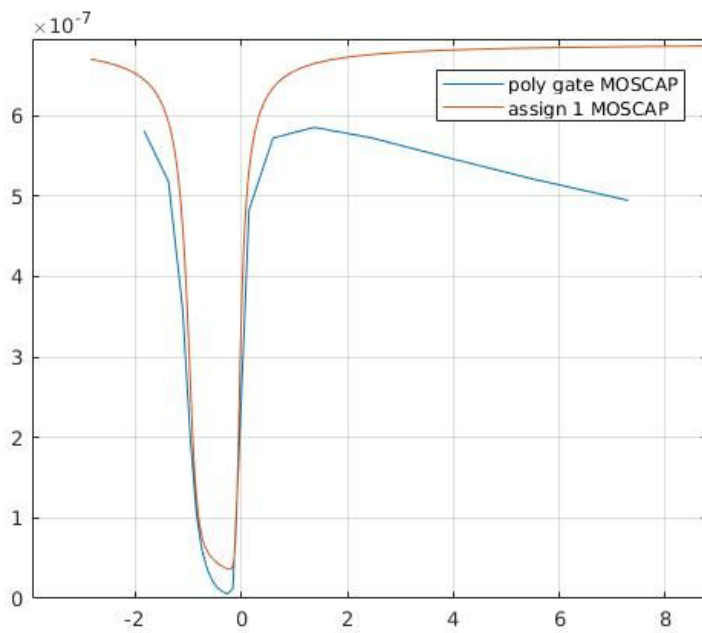*Vg=0 inversion*

Vg=0.5V inversion

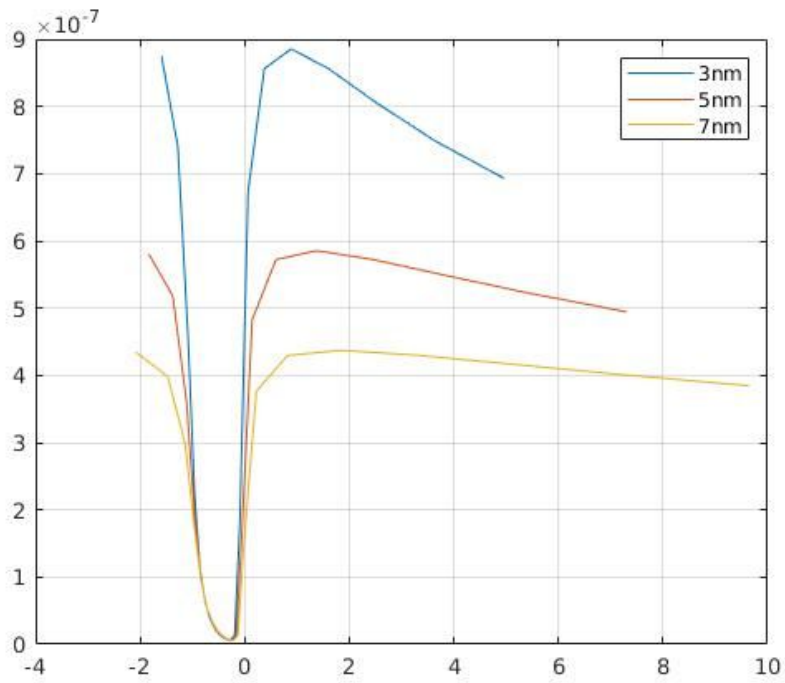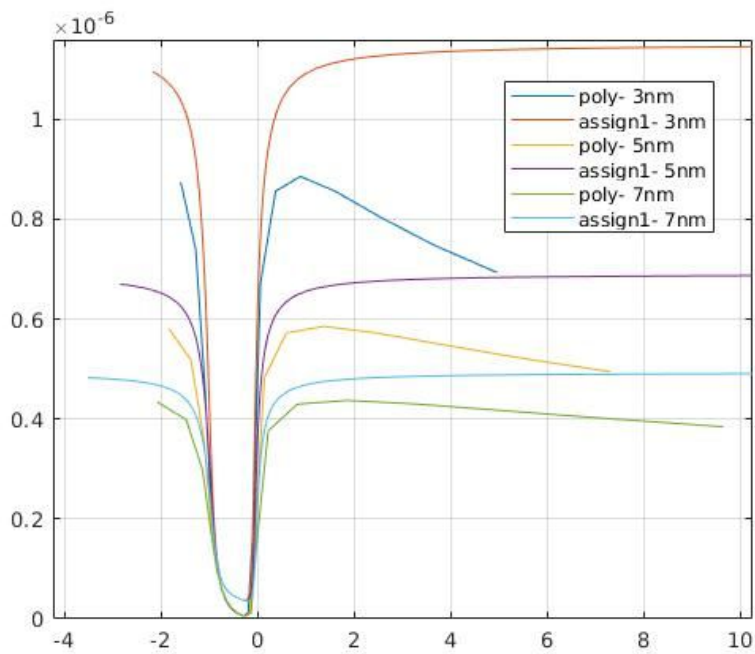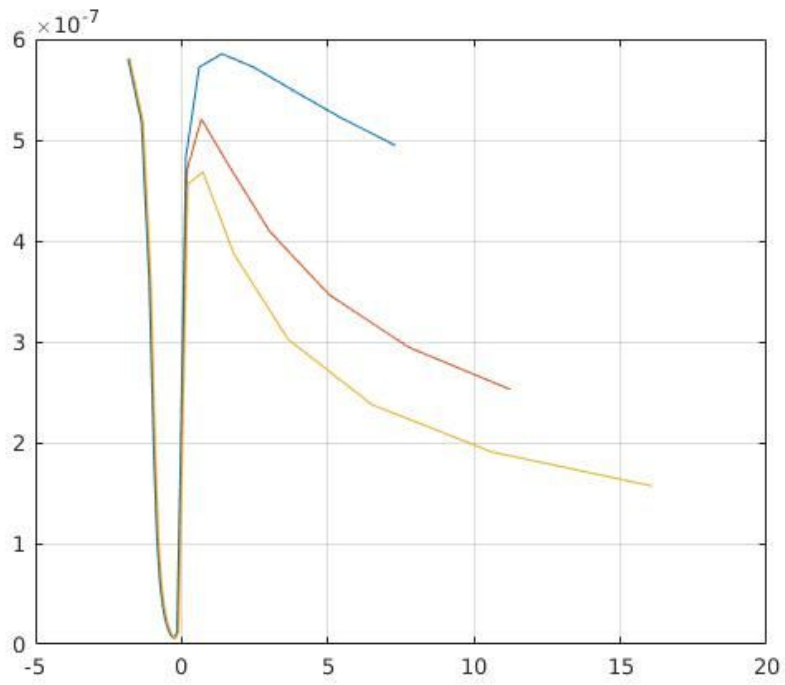## 2. LFCV and comparison with assignment 1
Q2q3q4.m and assign1_q2.m

LFCV

3.

N Poly = 5e19, vary T OX (3,5,7 nm)

On comparison with assignment 1,
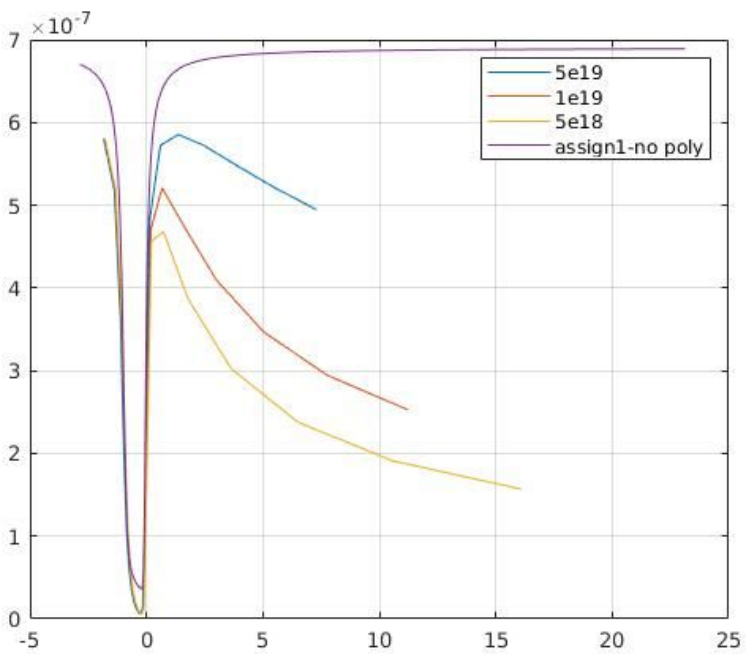

N Poly = 5e19, vary T OX (3,5,7 nm) and assignment 1 compare

3.

T OX =5nm, vary N Poly (5e19, 1e19, 5e18)

On comparison with assignment 1,

T OX =5nm, vary N Poly (5e19, 1e19, 5e18) and assignment 1 compare